APX5008

User Manual

V1.0

Index

1 Introduction....1
1.1 Thank you for purchasing....1
1.2 Appearance and Installation....1
1.2.1 Appearance....1
1.2.2 Package Contents....2
1.2.3 Installation....2
2 Configure the Router....3
2.1 Basic Configuration....3
2.1.1 System Status....3
2.1.2 Set the Login Password....4
2.1.3 Configure Network Interfaces....4
2.1.3.1 Configure WAN port....5
2.1.3.2 Configure LAN port....6
2.2 More Functions and Configurations....7
2.2.1 Status Checking....7
2.2.1.1 Firewall Status....7
2.2.1.2 Router Status....7
2.2.1.3 System Log....8
2.2.1.4 Kernel Log....8
2.2.1.5 Processes....9
2.2.1.6 Realtime Graphs....9
2.2.2 System Configuration....10
2.2.2.1 System....10
2.2.2.2 Administration....10
2.2.2.3 Software....11
2.2.2.4 Startup....11
2.2.2.5 Scheduled Tasks....12
2.2.2.6 Time Synchronization....12
2.2.2.7 Mount Points....13
2.2.2.8 Backup/Flash Firmware....13
2.2.2.9 Reboot....15
2.2.3 Services....16
2.2.3.1 Dynamic DNS....16
2.2.4 Network....17
2.2.4.1 DHCP/DNS....17
2.2.4.2 Hostnames....17
2.2.4.3 Static Routes....18
2.2.4.4 Firewall....18
2.2.4.5 Diagnostics....21
2.2.5 PBX Config....23
2.2.6 Toolbox....23
3 IP PBX....25

3.1 Configure the device via GUI....25
3.1.1 Access the GUI....25
3.1.2 System Status....25
3.1.3 Configure Hardware....25
3.1.4 Trunks....26
3.1.5 Outgoing Calling Rules....29
3.1.6 Dial Plan....30
3.1.7 Users....31
3.1.8 Ring Groups....33
3.1.9 Music On Hold....33
3.1.10 Call Queues....34
3.1.11 Voice Menu(IVR)....36
3.1.12 Time Intervals....37
3.1.13 Incoming Calling Rules....37
3.1.14 Voicemail....38
3.1.15 Paging/Intercom....41
3.1.16 Conferencing....41
3.1.17 Follow Me....42
3.1.18 Call Features....43
3.1.19 Voice Mail Group....44
3.1.20 Voice Menu Prompts....45
3.1.21 Call Recording....46
3.1.22 System Info....46
3.1.23 Backup....47
3.1.24 Options....48
3.1.25 Advanced Options....48
3.1.26Advanced Options -- Call Details Records....49
3.1.27Advanced Options -- Active channels....49
3.1.28 Advanced Options -- Bulk Add....49
3.1.29 Advanced Options -- File Editor....50
3.1.30 Advanced Options -- Asterisk CLI....50
3.1.31 Advanced Options -- SIP settings....51
3.1.32 Asterisk Logs....51
4 Application Notes....53
4.1 Different methods to access the PBX....53
4.2 Make free internal calls....53
4.3 Make outbound calls to PSTN and Receive outbound calls....55
4.3.1 Use Analog/FXO trunk....55
4.3.2 Link two PBX in the same network using VoIP Trunk....58
4.3.3 Link two PBX in different location using VoIP trunk....61

1 Introduction

1.1 Thank you for purchasing

Thank you for purchasing APX5008, APX5008 is a highly integrated, reliable, stable device, which includes rich Router and IP PBX functions. This manual introduces and describes how to install, how to configure and how to use APX5008, and it provides customers with a series of office configuration cases. User can use APX5008 to set your own IP Phone system. APX5008 provides a open source embedded IP PBX system, it runs ulinux and Asterisk and supports abundant IP PBX features.

1.2 Appearance and Installation

1.2.1 Appearance

APX5008 is a silver alloy device, user can see different ports on the panel of APX5008, you can see 1 reset console, 1 serial console, 4 LAN ports, 1 USB port, 1 SD card slot and 8 FXO ports on the front panel of APX5008. The following picture shows the ports and the table shows the functions of different ports:

Port	Description
Reset	Press reset button 5s to make APX5008 factory default.
Serial Console	Connect it to the com port of PC to enter APX5008's Linux interface.
Internet	Connect to Internet or router.
LAN	Connect to PC or build small LAN network.
USB	Access for USB storage device.
SD	Used to insert the SD memory card.
FXO	Used to connect to the analog line.

There is a power port and a power button on the back panel of APX5008.

1.2.2 Package Contents

- One APX5008
- Two L-shape brackets and some screws
- One serial console line
- One 4G SD card
- One power line

1.2.3 Installation

If user wants to use APX5008 as a gateway, please insert one end of the Ethernet cable into APX5008's Internet port and insert the other end of the Ethernet cable to your existing broadband connection port. And then log in APX5008's webpage to configure its Internet access ways, such as Static IP, DHCP or PPPoE;

If user wants to use APX5008 as bypass access, you don't need to connect to the Internet port; Insert one end of Ethernet cable into one of the LAN ports, and insert the other end of the Ethernet cable to your local network. Then connect the power adapter to the power port on the back panel of APX5008, and plug another end of power port into a wall outlet or power strip. And then please turn on APX5008.

The default IP for APX5008's LAN port is 192.168.0.1. Put the default IP in your web browser and it will redirect to the setting page of APX5008, the default username and password for the web access is:

Username: root

Password: admin

If you can't access APX5008, please check if you have connected the RJ-45 cable to the LAN port and if your computer is in the same network 192.168.0.xxx as APX5008.

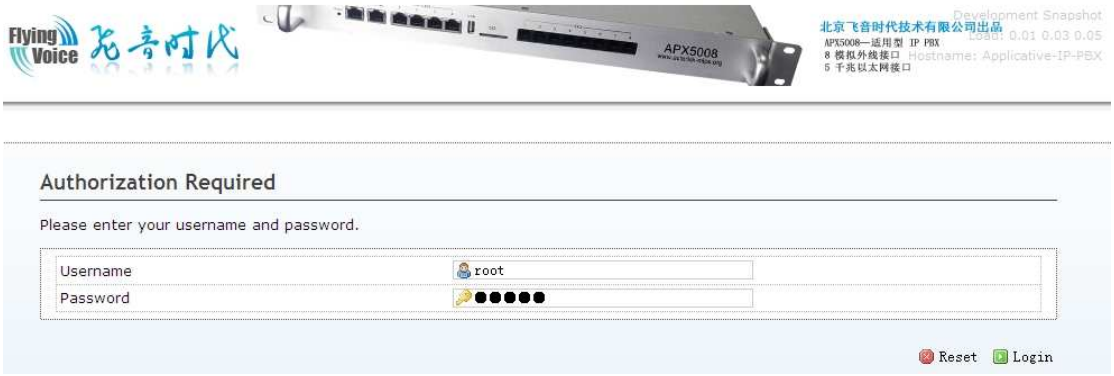
Notice: the recommended web browser for logging in APX5008 is Firefox.

2 Configure the Router

2.1 Basic Configuration

2.1.1 System Status

Access APX5008's router configuration page.
The default IP address of APX5008's LAN port is 192.168.0.1, the username is 'root', password is 'admin', the login page is as the following picture.



After enter the password, you will log in the router status page of APX5008.

System

- Router Name: display the router name;
- Router Model: display the router model;
- Firmware Version: display the current firmware version;

- Kernel Version: display the kernel version;
- Local Time: display the current time;
- Uptime: display the uptime since user turn on APX5008;
- Load Average: display the average load, the first figure represents the average load in 1 minute, and the second figure represents the average load in 5 minutes and the last one represents the average load in 15 minutes;

Memory

Display the current usage status of the memory.

Network

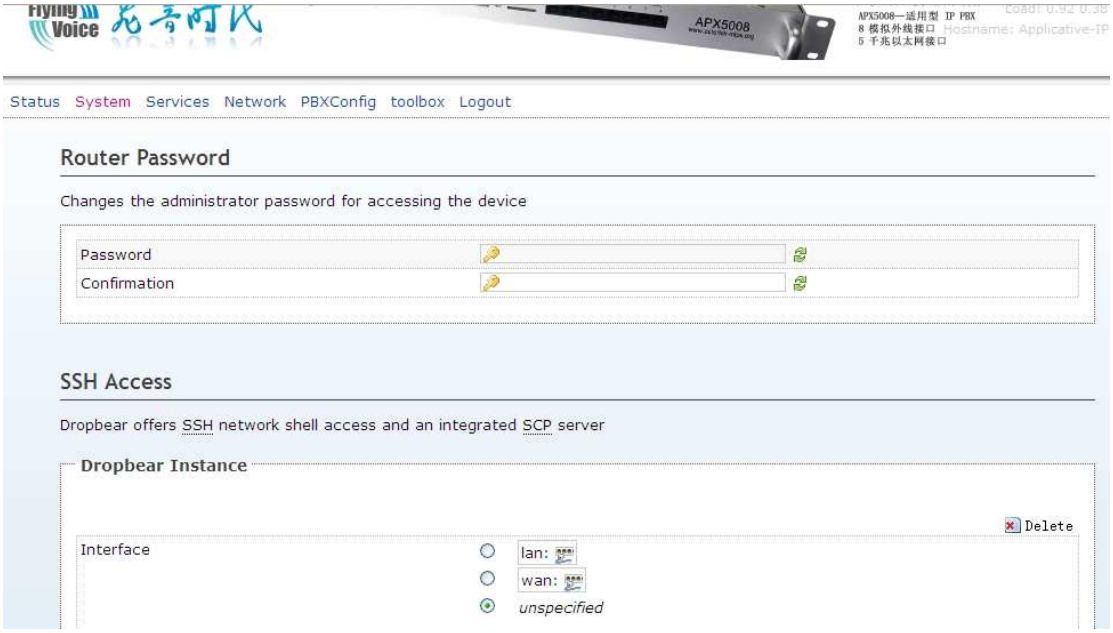
Display the current connection status of the Internet ports, including IP mode, IP address , gateway, connected time and the active connections.

DHCP Leases

Display the current IP addresses which APX5008 assigns to the DHCP client.

2.1.2 Set the Login Password

Press **System--->Administration** to log in the APX5008's administration page.



Router Password

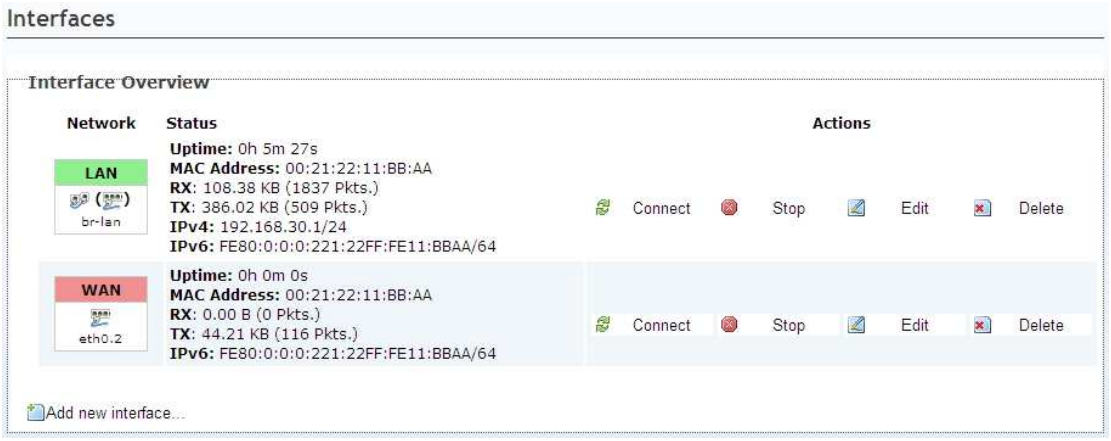
User can set or change the router password. Click the Save&Reply button which is at the lower right corner of the page after you finish entering.

SSH Access

Set the parameters of SSH access, such as interface, port, password authentication and so on.

2.1.3 Configure Network Interfaces

Click **Network-->Interface**, then user can login the network interface configuration page of APX5008, just like the following picture:



Both LAN port and WAN port have four options: Connect, Stop, Edit and Delete, functions of each options are as following:

◆ Connect: Click "Connect", APX5008 should disconnect the current network and connect again;

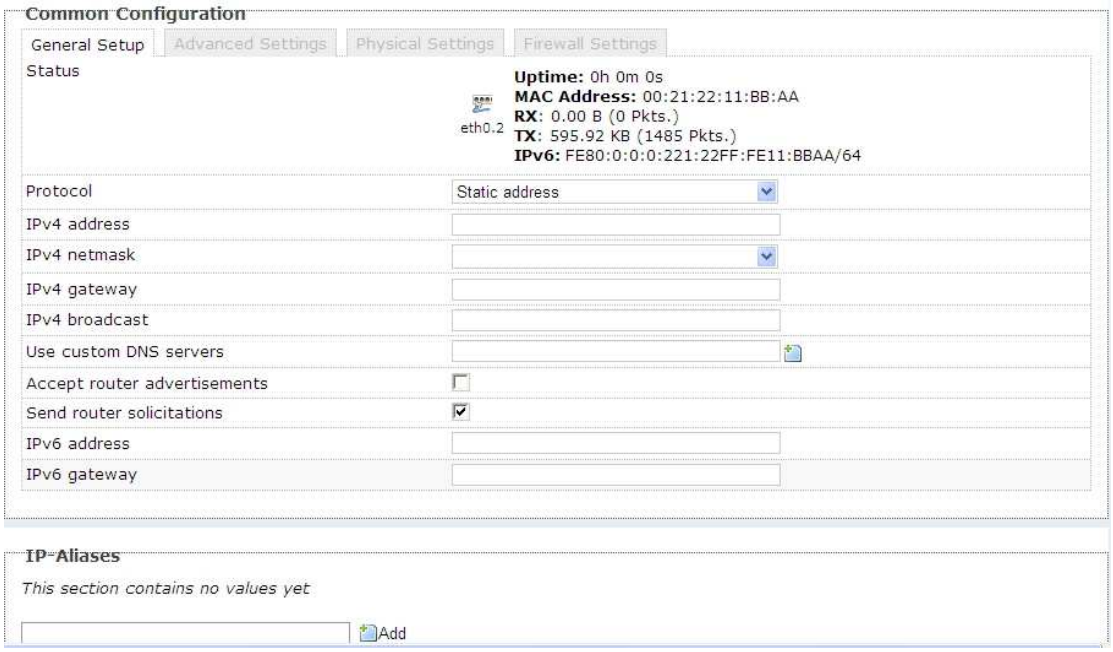
◆ Stop: Click "Stop", APX5008 should stop the current network connections;

◆Edit: Click "Edit", user can configure the corresponding network interfaces;

◆Delete: Click "Delete" to remove the current interface.(Please take care of this option)

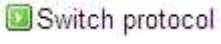
2.1.3.1 Configure WAN port

Click "Edit" option after WAN port, then user can begin to configure WAN port.



Firstly, user can configure the basic settings in General Setup column.

Status: Check the current information of WAN port .

◆Protocol: Choose the connection type of WAN port, options are Static address, DHCP client, PPPoE and so on, if user wants to change the connection type, please click 

, then user can begin to configure the corresponding parameters.

♦ DHCP Client

Hostname to send when requesting DHCP: the IP address of DHCP server that user assigns.

♦ Static Address:

IPv4 address: IPv4 address

IPv4 netmask: IPv4 netmask

IPv4 gateway: IPv4 gateway

IPv4 broadcast: IPv4 broadcast

Use custom DNS servers: enter the IP address of the custom DNS server

♦ PPPoE

PAP/CHAP username: the username of your PPPoE account

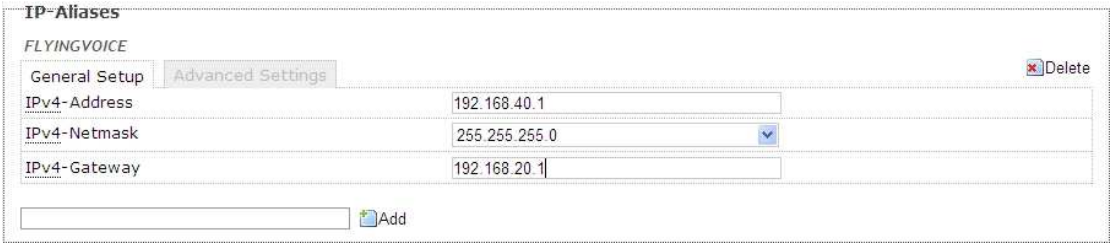
PAP/CHAP password: the password of your PPPoE account

Access Concentrator: the IP address of access concentrator, leave empty to autodetect

Service Name: the address of PPPoE server, leave empty to auto detect.

In **Advanced Settings** column, user can configure some other parameters, such as MAC, MTU and so on.(***Notice: when user choose different IP protocol, the parameters in this column should be different.***)

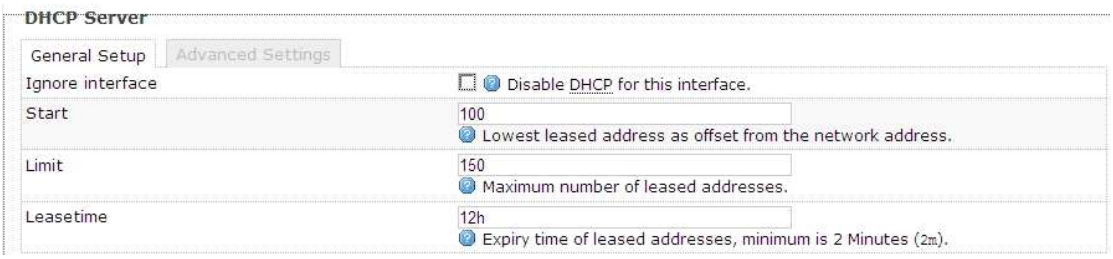
◆IP-Aliases: This option is used to add another IP address for this interface, in order to make one network interface correspond to multiple IP. Please enter an alias in the IP_alias text box, such as"flyingvoice", and then click Add , then user can configure the corresponding parameters, including IPv4-Address, IPv4-Netmask, IPv4-Gateway, IPv4-Broadcast and DNS-Server, the following picture shows the details of the parameters:



Click Delete to remove current IP-Aliases.

2.1.3.2 Configure LAN port

It is the same to configure the IP protocol of LAN port with WAN port, what is more, user can use LAN port to set as DHCP server, just like the following picture:



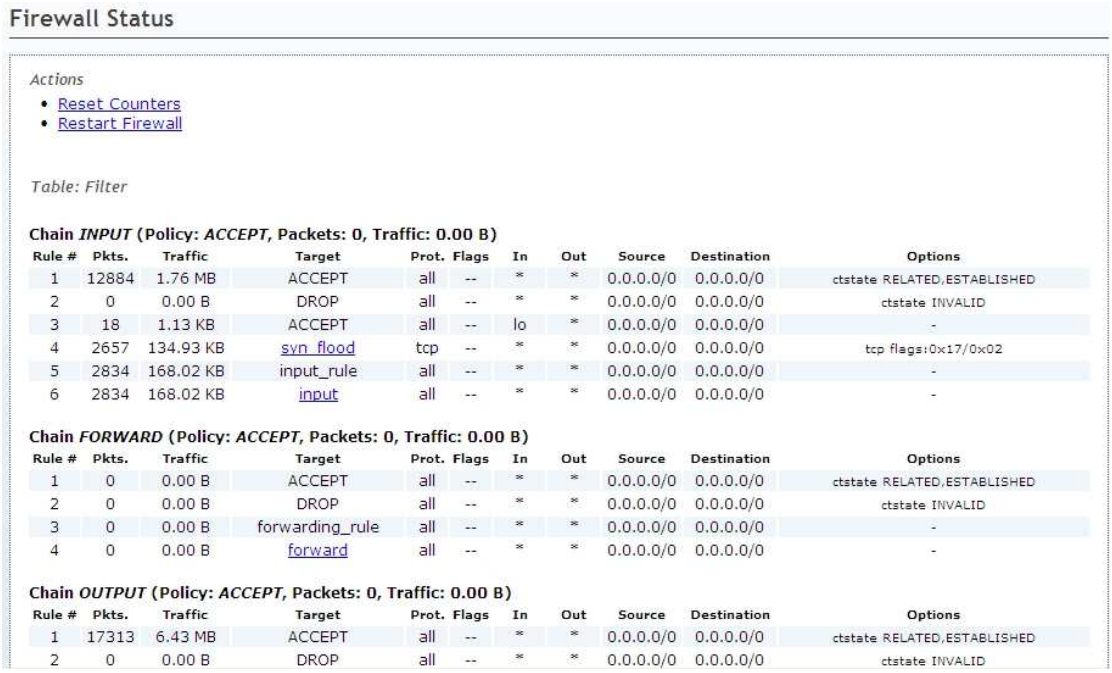
- Ignore interface: check this option, the DHCP server of this interface should be disabled.
- Start: the starting IP address the DHCP server assigns
- Limit: how many IP addresses should this server assigns
- Lease time: set expiry time of leased addresses, minimum is 2 Minutes(2m), and default is 12 hours.

2.2 More Functions and Configurations

2.2.1 Status Checking

2.2.1.1 Firewall Status

Click **Status-->Firewall,** user can check the status of firewall, reset counters and restart firewall.



Firewall Status

Actions

- Reset Counters
- Restart Firewall

Table: Filter

Chain *INPUT* (Policy: *ACCEPT*, Packets: 0, Traffic: 0.00 B)

Rule #	Pkts.	Traffic	Target	Prot.	Flags	In	Out	Source	Destination	Options
1	12884	1.76 MB	ACCEPT	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate RELATED,ESTABLISHED
2	0	0.00 B	DROP	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate INVALID
3	18	1.13 KB	ACCEPT	all	--	lo	*	0.0.0.0/0	0.0.0.0/0	-
4	2657	134.93 KB	syn_flood	tcp	--	*	*	0.0.0.0/0	0.0.0.0/0	tcp flags:0x17/0x02
5	2834	168.02 KB	input_rule	all	--	*	*	0.0.0.0/0	0.0.0.0/0	-
6	2834	168.02 KB	input	all	--	*	*	0.0.0.0/0	0.0.0.0/0	-

Chain *FORWARD* (Policy: *ACCEPT*, Packets: 0, Traffic: 0.00 B)

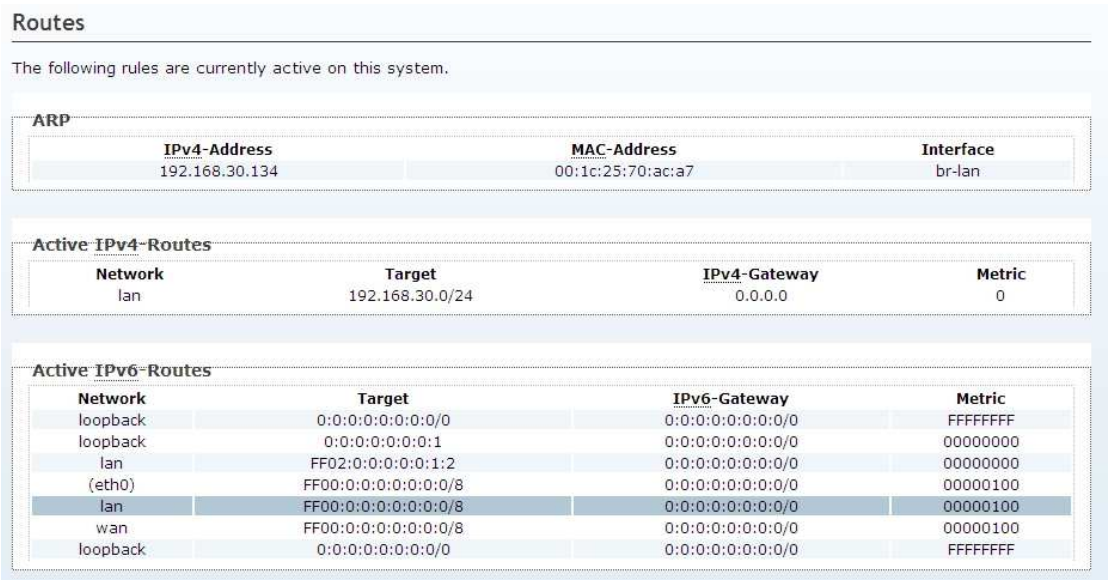
Rule #	Pkts.	Traffic	Target	Prot.	Flags	In	Out	Source	Destination	Options
1	0	0.00 B	ACCEPT	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate RELATED,ESTABLISHED
2	0	0.00 B	DROP	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate INVALID
3	0	0.00 B	forwarding_rule	all	--	*	*	0.0.0.0/0	0.0.0.0/0	-
4	0	0.00 B	forward	all	--	*	*	0.0.0.0/0	0.0.0.0/0	-

Chain *OUTPUT* (Policy: *ACCEPT*, Packets: 0, Traffic: 0.00 B)

Rule #	Pkts.	Traffic	Target	Prot.	Flags	In	Out	Source	Destination	Options
1	17313	6.43 MB	ACCEPT	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate RELATED,ESTABLISHED
2	0	0.00 B	DROP	all	--	*	*	0.0.0.0/0	0.0.0.0/0	ctstate INVALID

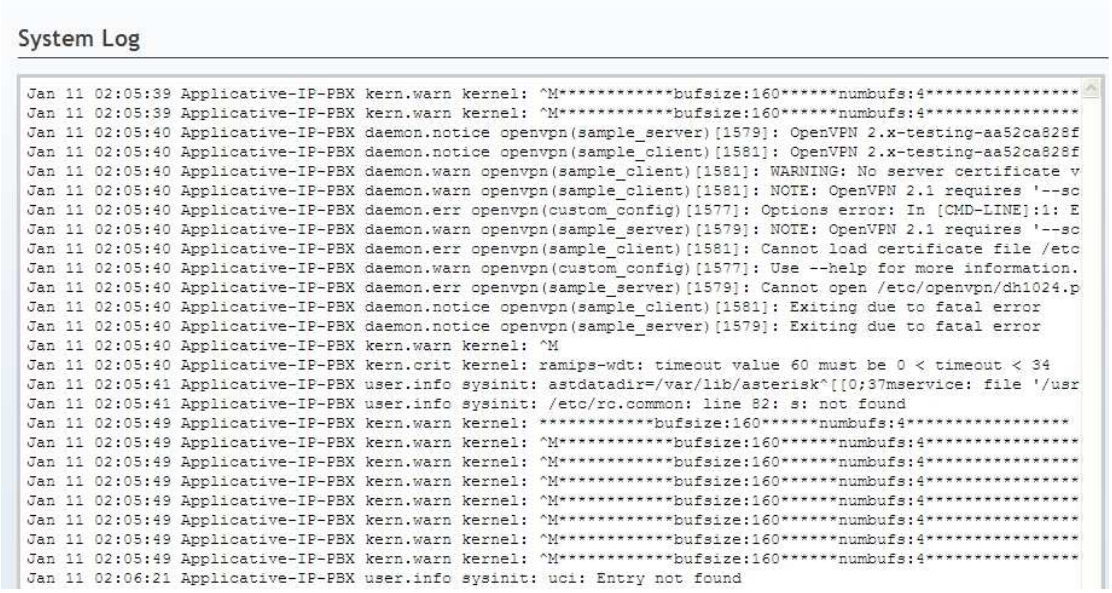
2.2.1.2 Router Status

Click **Status--> Router**, user can check the current ARP table and router table:



2.2.1.3 System Log

Click **Status --> System Log** to check APX5008's system log.



2.2.1.4 Kernel Log

Click **Status --> Kernel Log**, user can check the kernel log.

Kernel Log

```
Linux version 2.6.39.4 (root@localhost.localdomain) (gcc version 4.5.4 20110808 (prerelease) (Linaro GCC 4.5-
prom: fw_arg0=00000001, fw_arg1=87f3ffb0, fw_arg2=07f403b0, fw_arg3=00000000
env[0]: memsize=128
env[1]: initrd_start=0x00000000
env[2]: initrd_size=0x0
env[3]: flash_start=0x00000000
env[4]: flash_size=0x1000000
env[0]: memsize=128
env[1]: initrd_start=0x00000000
env[2]: initrd_size=0x0
env[3]: flash_start=0x00000000
env[4]: flash_size=0x1000000
bootconsole [early0] enabled
CPU revision is: 0001974c (MIPS 74Kc)
Ralink RT3883   id:1 rev:5 running at 500.00 MHz
Determined physical RAM map:
 memory: 08000000 @ 00000000 (usable)
Initrd not found or empty - disabling initrd
Zone PFN ranges:
  Normal   0x00000000 -> 0x00008000
Movable zone start PFN for each node
```

2.2.1.5 Processes

Click **Status-->Processes**, user can check the processes of APX5008.

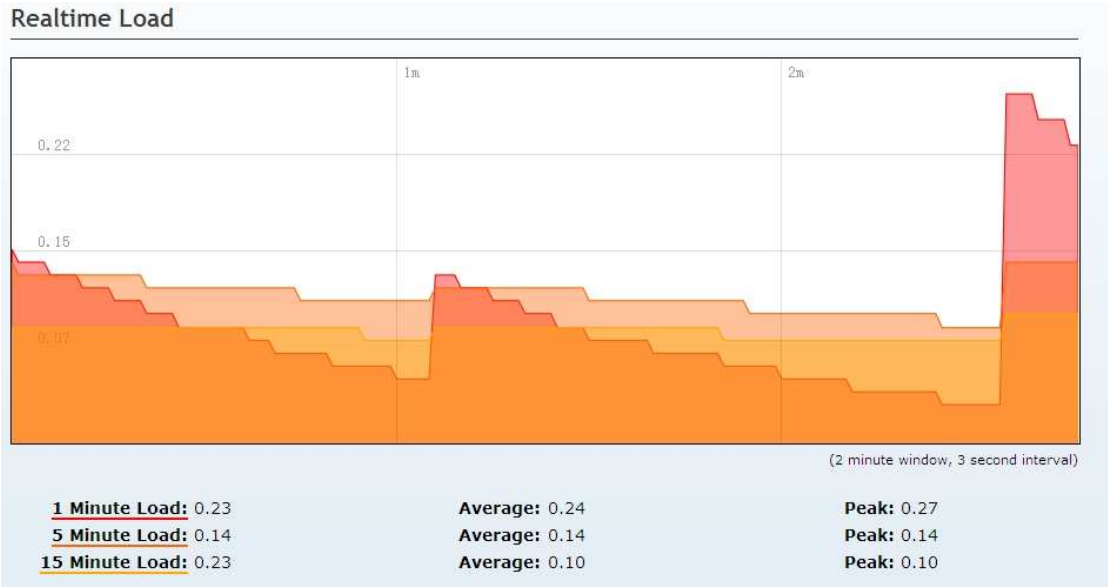
Processes

This list gives an overview over currently running system processes and their status.

PID	Owner	Command	CPU usage (%)	Memory usage (%)	Hang Up	Terminate	Kill
1	root	init	0%	1%	Hang Up	Terminate	Kill
2	root	[kthreadd]	0%	0%	Hang Up	Terminate	Kill
3	root	[ksoftirqd/0]	0%	0%	Hang Up	Terminate	Kill
4	root	[kworker/0:0]	0%	0%	Hang Up	Terminate	Kill
5	root	[kworker/u:0]	0%	0%	Hang Up	Terminate	Kill
6	root	[rcu_kthread]	0%	0%	Hang Up	Terminate	Kill
7	root	[khelper]	0%	0%	Hang Up	Terminate	Kill
45	root	[sync_supers]	0%	0%	Hang Up	Terminate	Kill

2.2.1.6 Realtime Graphs

Click **Status--> Realtime Graphs**, user can view some realtime graphs, such as real time graphs of Load, Traffic, Wireless and Connections.



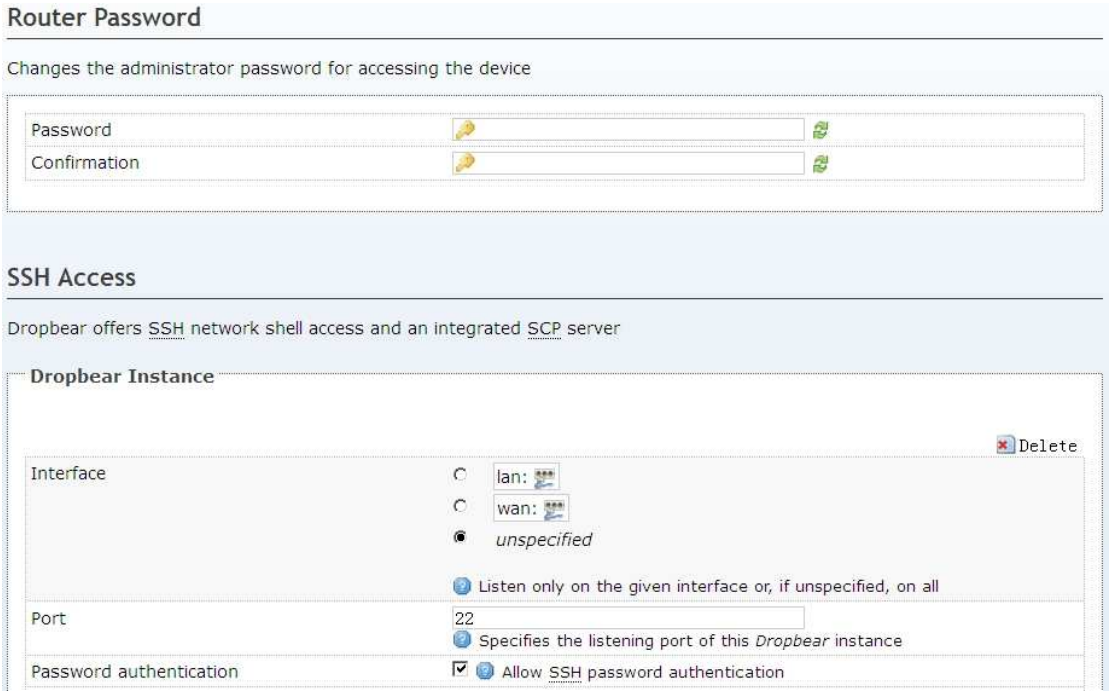
2.2.2 System Configuration

2.2.2.1 System

Click **System--> System** to begin system configuration, in this webpage, user can configure the Hostname and Timetome, and refresh the local time for APX5008; what is more, user can configure the parameters of system log: such as system log buffer size, log level, log server and so on; lastly, user can change the Language and Style of APX5008, APX5008 support English and Chinese at this moment.

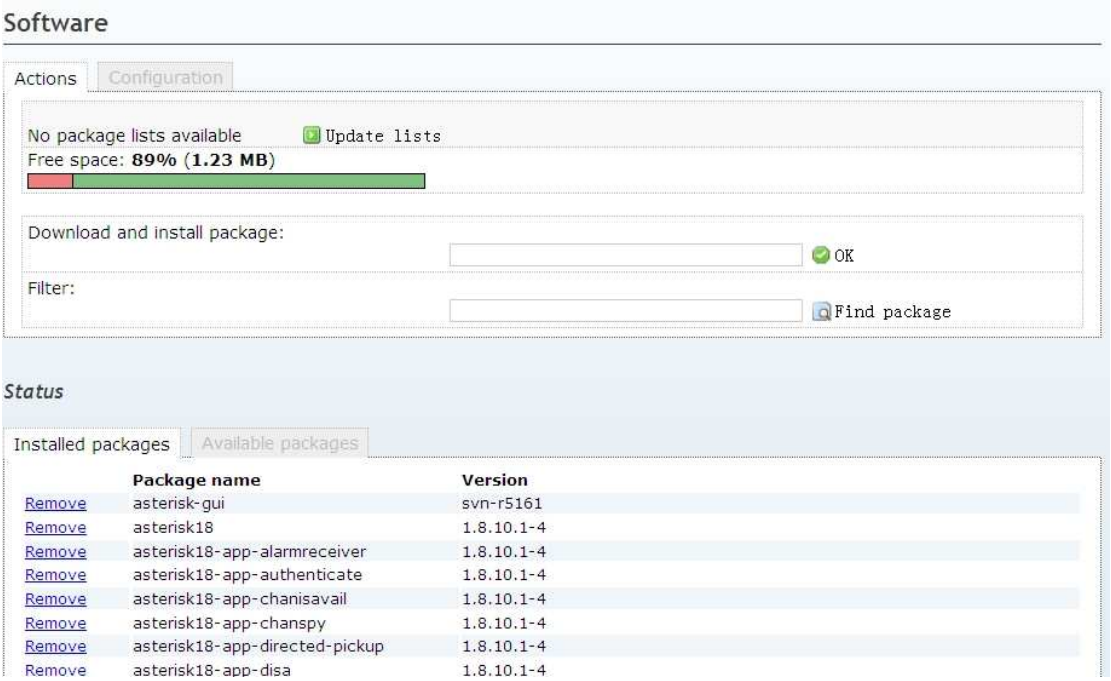
2.2.2.2 Administration

Click **System--> Administration**, user can login the management webpage of APX5008, and configure the router login password and SSH Access.



2.2.2.3 Software

Click **System--> Software** to login the management webpage of system software, in this webpage, user can check the usage of Flash, install new software, remove the old firmware and so on.



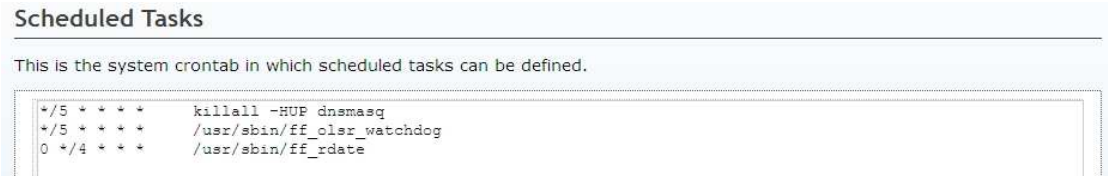
2.2.2.4 Startup

Click **System--> Startup** to login the startup management webpage, in this webpage, user can enable or disable the initscripts, and user can start/stop/restart the initscript.

Initscripts
You can enable or disable installed init scripts here. Changes will applied after a device reboot.
Warning: If you disable essential init scripts like "network", your device might become inaccesable!
Start priority
Initscript
Enable/Disable
Start
Restart
Stop
0 umount Disabled Start Restart Stop
5 luci_fixtime Enabled Start Restart Stop
10 boot Enabled Start Restart Stop
127 rcS Disabled Start Restart Stop
20 fstab Enabled Start Restart Stop
39 usb Enabled Start Restart Stop
40 dahdi Enabled Start Restart Stop
40 network Enabled Start Restart Stop
45 firewall Enabled Start Restart Stop
50 asterisk Enabled Start Restart Stop
50 cron Enabled Start Restart Stop

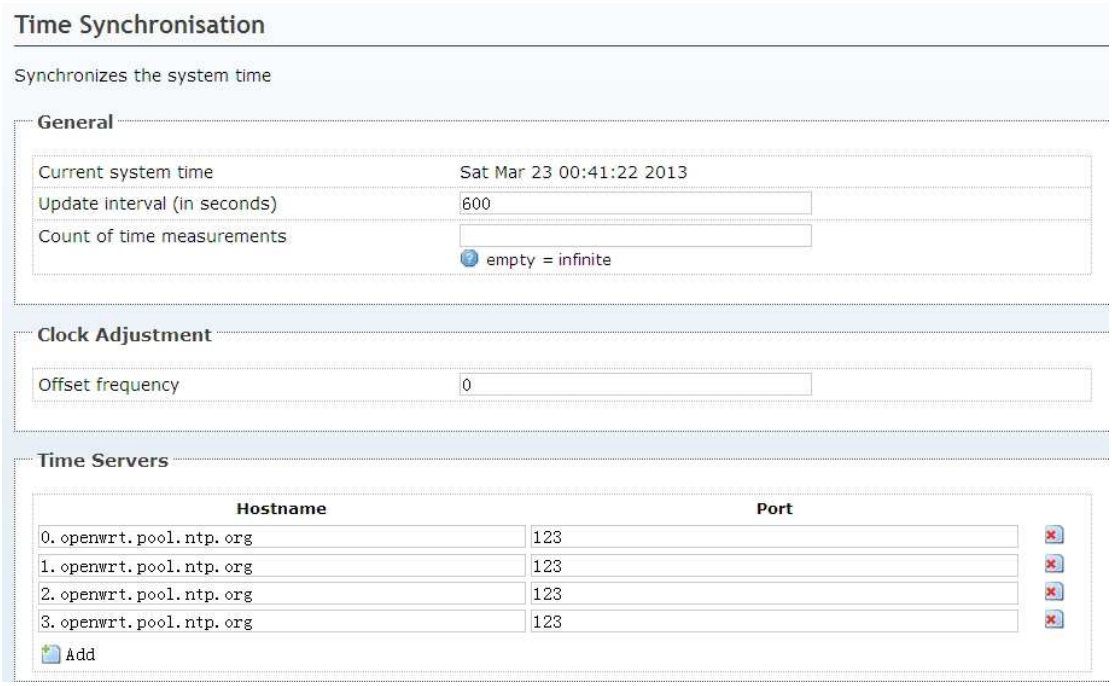
2.2.2.5 Scheduled Tasks

Click **System--> Scheduled Tasks**, user can login the scheduled tasks page of APX5008, in this page, user can view the current tasks, and can add customized scheduled tasks.


Scheduled Tasks
This is the system crontab in which scheduled tasks can be defined.
*/5 * * * * killall -HUP dnsmasq
*/5 * * * * /usr/sbin/ff_olsr_watchdog
0 */4 * * * /usr/sbin/ff_rdate

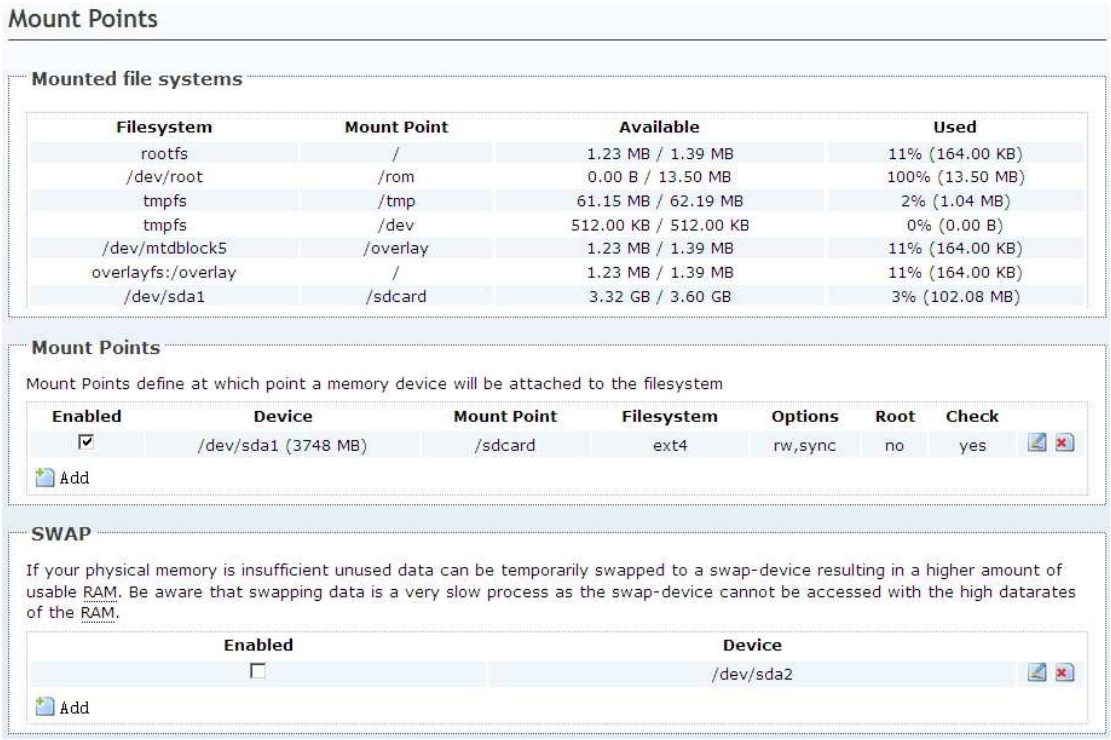
2.2.2.6 Time Synchronization

Click **System-->Time Synchronization**, user can login the time synchronization page of APX5008, in this page, user can configure the update interval, offset frequency and time servers.



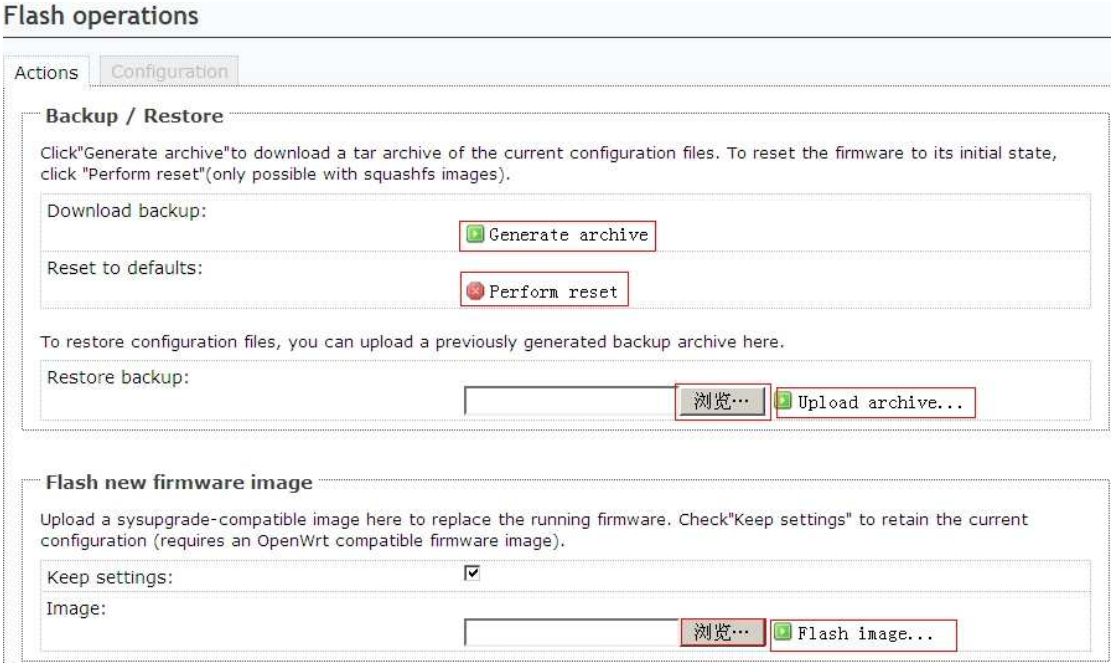
2.2.2.7 Mount Points

Click **System--> Mount Points** to login the mount points page of APX5008, and in this page, user can check the current mounted file systems and mount points, what is more, user can enable SWAP or modify the parameters of current SWAP.



2.2.2.8 Backup/Flash Firmware

Click **System--> Backup/Flash Firmware** to login APX5008's Flash Operations page, in this page, user can backup the configuration files of APX5008, and make APX5008 factory default, additionally, user can upgrade a new firmware for APX5008.


Flash operations
Actions
Configuration
Backup / Restore
Click"Generate archive"to download a tar archive of the current configuration files. To reset the firmware to its initial state, click "Perform reset"(only possible with squashfs images).
Download backup:
Generate archive
Reset to defaults:
Perform reset
To restore configuration files, you can upload a previously generated backup archive here.
Restore backup:
浏览…
Upload archive...
Flash new firmware image
Upload a sysupgrade-compatible image here to replace the running firmware. Check"Keep settings" to retain the current configuration (requires an OpenWrt compatible firmware image).
Keep settings:
Image:
浏览…
Flash image...

1) Download backup

Click Generate archive , the browser will remind user to download the configuration file, click Save and select the directory, then the file will be saved in your local PC(the file contains all the configurations of APX5008)

2) Restore to defaults

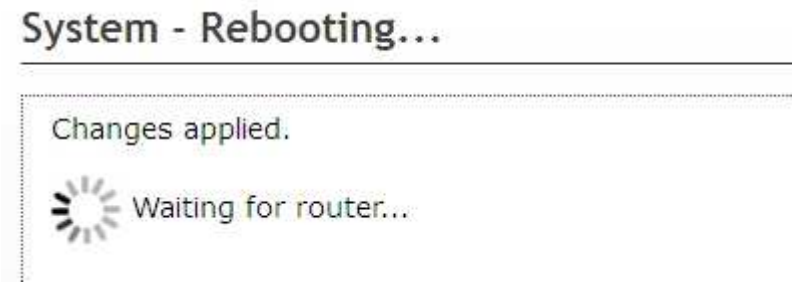
Click Perform reset to make APX5008 factory default.

Notice:A hard reset will remove all your settings, and your device will be restored to factory default settings. Do not perform a hard reset unless you have backed up your settings or you can do the configurations again.

3) Restore backup

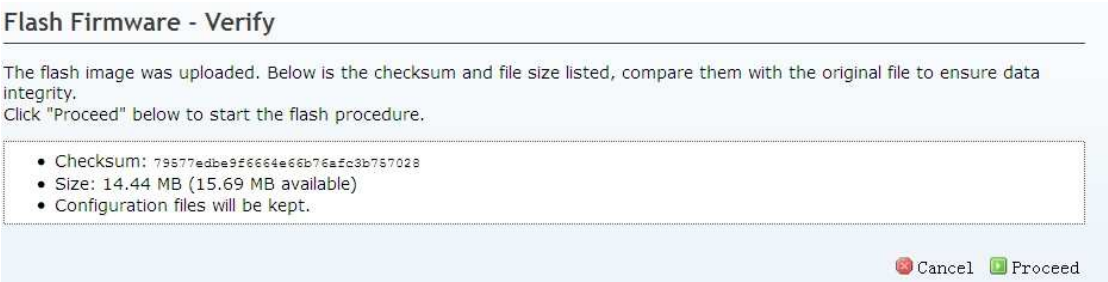
This action will make user be able to restore all the configurations of APX5008.

Click 浏览… to select the file you need to restore and click Upload archive... to upload the file. After you press Upload archive... button, the system will remind user that changes applied and system is rebooting.



4) Flash new firmware image

When upgrade a new firmware, check the option Keep settings: , then all the configurations on the PBX will be retained, if user does not check this option, when APX5008 finishes upgrading, all the configurations will be the default ones. And click 浏览… to select the firmware user need to upgrade and click Flash image... , then APX5008 system will ask you to verify the performance, click Proceed to confirm the action and click Cancel to cancel.


Flash Firmware - Verify
The flash image was uploaded. Below is the checksum and file size listed, compare them with the original file to ensure data integrity.
Click "Proceed" below to start the flash procedure.
Checksum: 79577edbe9f6664e66b76afc3b757028
Size: 14.44 MB (15.69 MB available)
Configuration files will be kept.
Cancel
Proceed

Click Proceed, APX5008 will finish upgrading automatically and reboot itself. It takes several minutes for APX5008 to finish the upgrading, please be patient.

Notice: do not power off when APX5008 is upgrading, or the upgrading may fail or the file may be damaged.

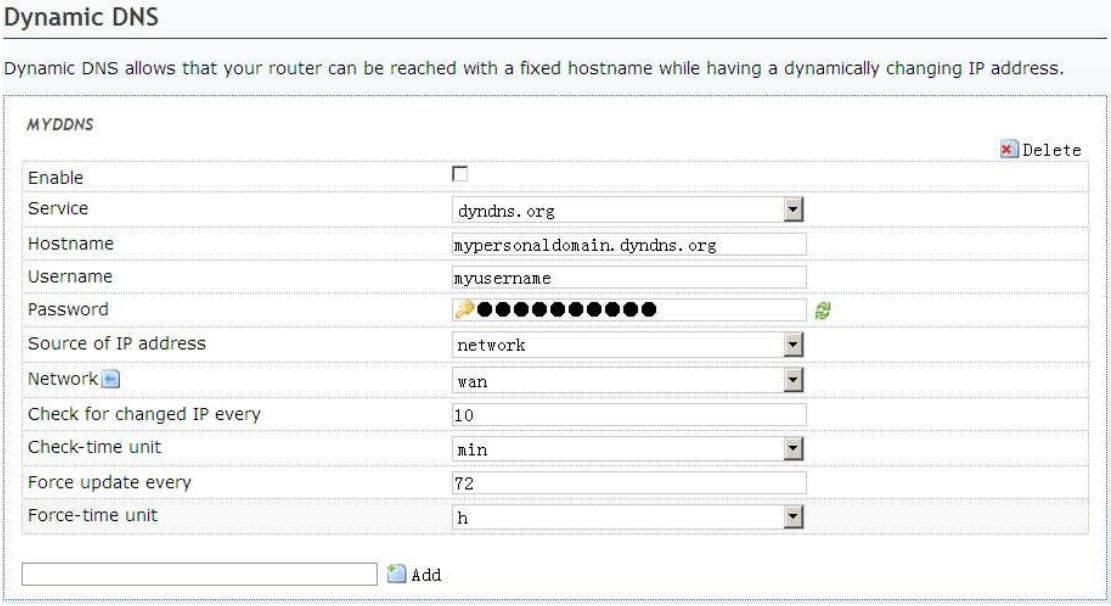
2.2.2.9 Reboot

Click **System--> Reboot** to login the reboot page of APX5008, click Perform reboot , then APX5008 will reboot.

2.2.3 Services

2.2.3.1 Dynamic DNS

Dynamic DNS allows that your router can be reached with a fixed hostname while having a dynamically changing IP address. Configurations are as following:



◆ Enable: check this option, the DDNS you configured can take effect, or the DDNS won't take effect.

◆ Service: Enter the service provider which supports DDNS service to you.

◆ Hostname: Enter the domain name that you get from the provider.

◆ Username: Enter the username that you get from the provider.

◆ Password: Enter the password that you get from the provider.

◆ Source of IP address: Configure the source of IP address which you would like to bind the domain name to, such as Interface, URL and network.

◆ Check for changed IP every: set a time interval for the system to check if the IP changed, every time interval, the device will check whether the IP of the interface which binds to the DDNS changes, if it does, the system will send the new IP address to the server.

◆ Check-time unit: set the unit for the checking changed IP interval, minute or hour, for example.

◆ Force update every: In the setting time, the APX5008 will make force update on the IP and send the IP to the DDNS server.

◆ Force-time unit: set the unit for force update time, minute or hour, for example.

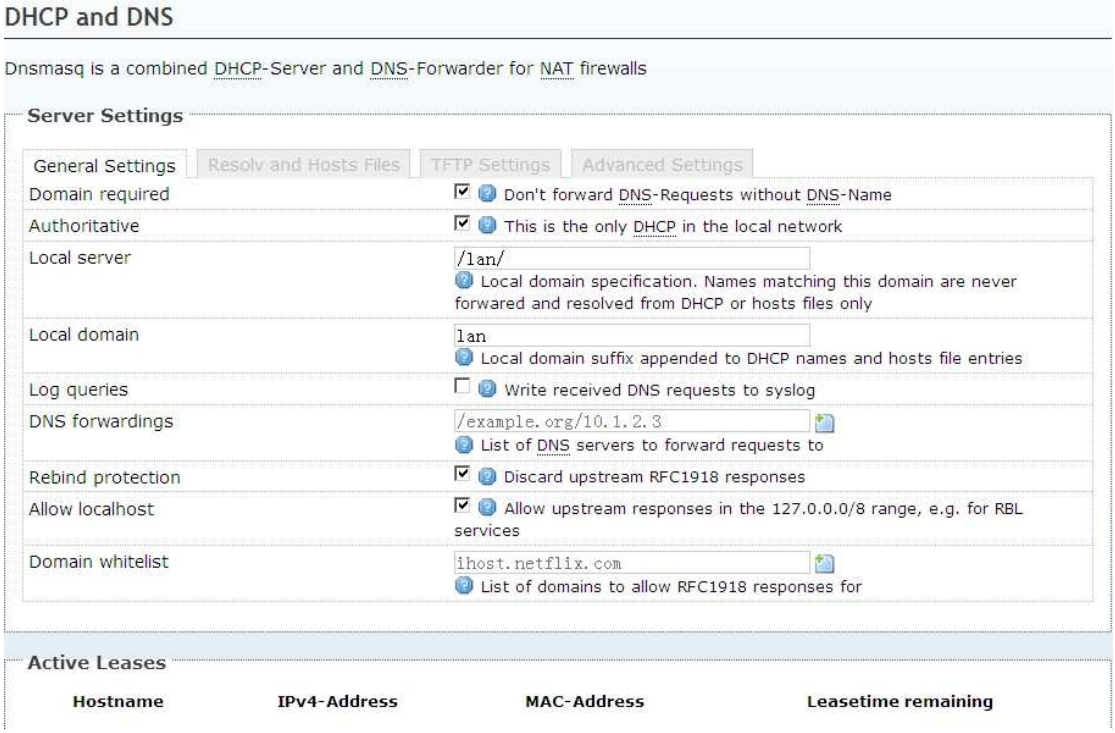
Additionally, APX5008 system support multiple DDNS, user can click

to add several DDNS.

2.2.4 Network

2.2.4.1 DHCP/DNS

Click **Network--> DHCP/DNS** to login the configuration page. In this page, user can configure some parameters of DHCP and DNS, including NAT and firewall.



◆ General Settings: Configure the parameters of DNS.

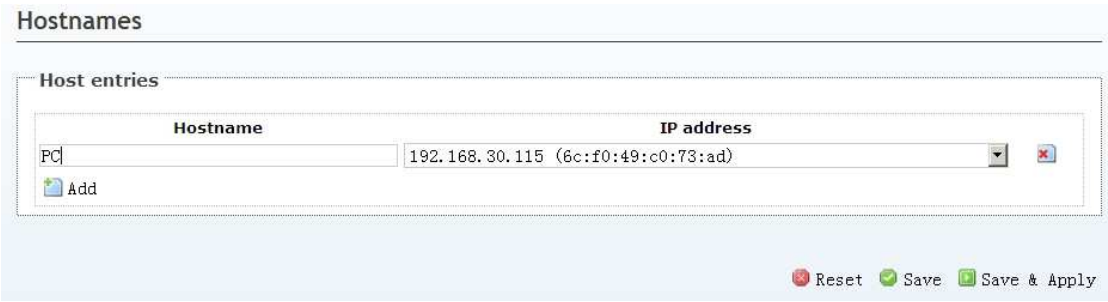
◆ Resolv and Hosts Files: Configure the parameters of DHCP.

◆ TFTP Settings: The tftp server is embedded in the APX5008 system, this can be used to be network TFTP to share the resources.

◆ Advanced Settings: In this page, there are some advanced settings on DHCP and DNS, such as DNS query port, Max. DHCP leases, Max. EDNS0 packet size and so on.

2.2.4.2 Hostnames

Click **System--> Hostnames** to login the hostname configuration webpage, where you can set the host name to the client. Please enter the hostname user named in the hostname option and enter the IP address of the device which is connected to the APX5008, click Save&Apply.



Click Add to add multiple hostnames.

2.2.4.3 Static Routes

User can set the data forwarding routing manually in Static Routes, which is suitable for the simple and relatively stable network environment. Click **Network-->Static Routes** to login the configuration page of Static Routes.

◆ Interface: Select the interface which is used to forwarding the data.

◆ Target: Enter the target of data forwarding, which can be an single IP address or an IP network, if it is a network, please enter the netmask of the network.

◆ IPv4-Netmask: If the target is a network, please enter the netmask of the network.

◆ IPv4-Gateway: If the data can not be transmitted directly, please enter the gateway address to forward the data to the packet.

◆ Metric: Please enter how many routings the data should pass through before arriving in the gateway.

◆ MTU: Enter the packet length limit of the forwarding data.

The parameters of IPv6 are all the same with IPv4 except that user does not need to enter the subnet mask.

2.2.4.4 Firewall

Firewall settings are very important, these relates to not only the data access among the internal network, but also the data transmission between the internal network and the outside network, and play an important role in network security.

Click **Network--> Firewall** to login the configuration webpage of APX5008's firewall.